

In the claims:

Claims 1 to 15 (canceled)

Claim 16 (currently amended) A method for forming metallurgical connections between metal wires and bond pads positioned on integrated circuits having copper interconnecting metallization, comprising the steps of:

depositing seed metal to activate the surface of said copper metallization of said bond pads;

plating on said seed metal a barrier layer, by electroless deposition, said barrier layer having a thickness of at least about 0.5 μm , said barrier layer selected from a group consisting of nickel, cobalt, chromium, molybdenum, titanium, tungsten, and alloys thereof;

plating on said barrier layer a bondable layer, by electroless deposition, said bondable layer having a thickness of at least about 0.4 μm , said bondable layer selected from a group consisting of gold, palladium, platinum, and silver; and

bonding one of said metal wires onto said bondable layer;

wherein said step of plating on said barrier layer a bondable layer comprises the steps of:

conducting a self-limiting surface metal replacement; and

conducting an autocatalytic deposition.

Claim 17. (canceled)

Claim 18 (previously presented) The method of Claim 16, wherein said step of plating on said seed metal a barrier layer comprises plating said barrier layer having a thickness in the range of about 0.5 μm to about 1.5 μm .

Claim 19 (previously presented) The method of Claim 16, wherein said step of plating on said barrier layer a bondable layer comprises plating said bondable layer having a thickness in the range of about 0.4 μm to about 1.5 μm .

Claim 20 (previously presented) The method of Claim 16, wherein said step of depositing seed metal is preceded by a step comprising:

depositing a protective overcoat over the surface of said integrated circuit, including the surface portions having copper metallization; and

opening selected areas of said overcoat, exposing the surface of said copper metallization.

Claim 21 (previously presented) The method of Claim 20, further comprising the step of immersing said exposed surface of said copper metallization in an acid solution.

Claim 22 (currently amended) A method for forming metallurgical connections between metal wires and bond pads positioned on integrated circuits having copper interconnecting metallization, comprising:

depositing palladium seed metal to activate the surface of said copper metallization of said bond pads;

plating on said seed metal a layer of nickel, by electroless deposition, said layer of nickel having a thickness of at least about 0.5 μm ;

plating on said layer of nickel a layer of gold, by electroless deposition, said layer of gold having a thickness of at least about 0.4 μm ; and

bonding one of said metal wires onto said layer of gold;

wherein said step of plating on said nickel layer a layer of gold comprises the steps of:

conducting a self-limiting surface metal replacement; and

conducting an autocatalytic deposition.

Claim 23 (canceled)

Claim 24 (previously presented) The method of Claim 22, wherein said step of plating on said seed metal a layer of nickel comprises plating a nickel layer having a thickness in the range of about 0.5 μm to about 1.5 μm

Claim 25 (previously presented) The method of Claim 22, wherein said step of plating on said layer of nickel a layer of gold comprises plating a gold layer having a thickness in the range of about 0.4 μm to about 1.5 μm .

Claim 26 (previously presented) The method of claim 22, wherein said step of depositing seed metal is preceded by a step comprising:

depositing a protective overcoat over the surface of said integrated circuit, including the surface portions having copper metallization; and
opening selected areas of said overcoat, exposing the surface of said copper metallization.